

The Impact of Mandatory Sustainability Assurance on Reporting Credibility in the Amman Stock Exchange

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Research Article

Keywords: mandatory sustainability assurance, SDG reporting quality, difference-in-differences, corporate governance, Amman Stock Exchange, emerging markets, audit quality

Posted Date: April 24th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9152028/v1>

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Additional Declarations: No competing interests reported.

Abstract

Objectives:

This study examines the causal impact of mandatory sustainability assurance on the credibility of sustainability reports in an emerging market context. Specifically, it evaluates the regulatory reform introduced by the Jordan Securities Commission in 2023, which mandates external assurance for sustainability reports of firms listed on the Amman Stock Exchange with market capitalization exceeding JOD 100 million. The objective is to provide structured evidence on how regulatory intervention influences reporting quality, audit effort, and capital market outcomes.

Data description:

The dataset comprises 110 firms observed over the period 2020–2024, resulting in 550 firm-year observations. The data include measures of sustainability reporting quality based on SDG disclosures, assurance fees, number of assurance procedures, cost of equity, and proxies for information asymmetry. Additional variables capture corporate governance characteristics such as audit committee expertise and ownership structure. The dataset enables analysis of pre- and post-regulatory changes and supports causal inference using difference-in-differences and related methods.

Limitations

- Sample limited to Jordan
- Time period restricted to 2020–2024
- Availability of sustainability disclosures varies across firms

JEL Classification: M42, M48, G34, G38, Q56

1. INTRODUCTION

Against this backdrop, the recent mandatory sustainability reporting regulations across the globe have spurred increased attention from researchers, investors, and regulators towards understanding how these regulations can increase reliability and credibility of sustainability reports to enhance the confidence of the global capital market (Simnett, Vanstraelen, & Chua, 2009; Kolk & Perego, 2010). While the new European Union directive on Corporate Sustainability Reporting Directive (CSRD) and the newly formed International Sustainability Standards Board (ISSB) represent a fundamental step in terms of sustainability reporting standards and regulations in developed markets, the effects of mandatory sustainability assurance in emerging markets are still unexplored. This is important because emerging markets have different institutional features compared to developed markets, such as concentrated ownership, enforcement mechanisms, and an emerging market for sustainability assurance (Young, Peng, Ahlstrom, Bruton, & Jiang, 2008).

In 2023, the Jordan Securities Commission (JSC) issued Directive No. 14/2023 "Regarding the External Assurance Report on the Sustainability Report issued by Companies listed on the Amman Stock Exchange whose Market Value of Capital exceeds JOD 100 million," which stated companies with a market value of capital exceeding JOD 100 million are required to obtain external assurance on their disclosed sustainability reports. Jordan has embraced the United Nations Sustainable Development Goals to tackle the issues of social and environmental sustainability. This objective and a capital value cut-off for mandatory assurance represent a natural experiment for causal inference using a difference-in-differences design. On one side of the cutoff are around 38 firms that are required to be assured, and on the other side are about 72 firms that are exempt due to having a capital value less than JOD 100 million. This setting eliminates the endogeneity problem in studying the effects of voluntary assurance (Leuz & Wysocki, 2016; Roberts & Whited, 2013).

This paper is motivated by three strands of theoretical literature. First, the theory of regulatory impact (Stigler (1971), Posner (1974), and Peltzman (1976)) predicts that mandatory assurance will change the incentives of the preparers and will lead to meaningful changes in the reports because of the increased costs of low-quality reports. Second, the audit quality production function (Francis (2011) and DeFond and Zhang (2014)) predicts that the inputs of the auditors (such as effort, scope, expertise, etc.) in providing the assurance are likely to change as a result of the mandatory engagement, which can affect both the cost of the assurance and the scope of verification that is directly observable through the production function. Third, the principal–principal agency problem (Young et al. (2008)) predicts that the controlling shareholders of a firm in an emerging market will react to the regulators' imposition of the mandatory assurance, either positively or negatively, since the ownership in these markets is commonly concentrated.

We use a panel data set of 550 firm-year observations (110 firms $\times$ 5 years) from the firms listed in the ASE for the period 2020–2024 to run our difference-in-differences regressions, including firm and year fixed effects and clustering our standard errors at the firm level. Our estimated sample includes five main dependent variables: our SDG Reporting Quality Index (SDG_RQI), assurance fees, the scope of assurance, the cost of equity, and information asymmetry (measured by the bid-ask spread). Our findings reveal that the treatment effect is statistically and economically meaningful for all of the dependent variables. We find that the treated firms experience an increase of 12.4 points in the SDG_RQI, which is a sizable improvement of 29% ($p < 0.01$). The treated firms also experience a 286% rise in the assurance fees ($p < 0.01$), which measures the auditory effort, and 4.2 more in the scope of assurance ($p < 0.01$). Our results further reveal that the treated firms observe a reduction of 85 basis points in their cost of equity ($p < 0.01$), and a 15% decrease in bid-ask spreads ($p < 0.01$).

Next, we test for governance-based heterogeneity in the effect of the mandate using triple difference-like testable empirical specifications. We find that audit committee sustainability expertise magnifies the impact of the mandate on the quality of sustainability reporting by 8.3 percentage points (p -value < 0.05), whereas concentrated family control reduces the impact by 6.7 percentage points (p -value < 0.05). We also document a positive, yet marginally significant, moderating effect of Big Four audit firms. We further

conduct a mechanism analysis using Sobel mediation t-tests. We find that auditor effort, proxied by the scope of the assurance, mediates 45% of the total effect of the treatment, and governance oversight mediates 23%, whereas the reputational channel is not significant due mainly to the limited sustainability journalism community in Jordan.

This paper contributes along three dimensions. First, it is the first to examine, in a causal way, the effectiveness of mandatory sustainability assurance in the MENA region. It contributes to the regulatory economics literature that mostly focuses on Western European and Australasian countries (Simnett, Vanstraelen, & Chua, 2009; Zorio, García-Benau, & Sierra, 2013). Second, our paper is the first to our knowledge that enriches the audit quality theory. We find strong evidence that the production function shifts significantly under regulation. The channel of transmission is through the efforts of auditors. Finally, we document two governance boundary conditions, namely audit committee expertise and family ownership concentration, that drive the heterogeneous impact of the sustainability assurance regulation. These two conditions enrich a black and white view of efficacy (effective vs. ineffective) that prevails in the literature.

2. INSTITUTIONAL BACKGROUND

2.1 Jordan's Sustainable Development Commitments

Within the MENA region, Jordan is regarded as a leader in sustainable development. Since it ratified the Paris Agreement in 2015, the country has moved swiftly toward adopting the United Nations' SDG agenda for national development. The most recent development strategies, such as the Jordan 2025 National Vision and Executive Development Programme, emphasize sustainable development (Eccles & Krzus, 2014). The role of Jordanian corporations in furthering national sustainable development goals has been receiving increased attention from national regulators. The 2017 and 2019 amendments to the Companies Law and the 2017 JSC corporate governance code of governance mandate reporting on environmental and social matters and encourage boards of directors' engagement on sustainability issues (Michelon, Pilonato, & Ricceri, 2015).

2.2 The Amman Stock Exchange and Regulatory Framework

The ASE is the main securities exchange in the Hashemite Kingdom and was established in 1999 as a successor to the Amman Financial Market. As of 2024, about 170 companies from the manufacturing, services, financial, and real estate sectors were listed on the ASE with a total market capitalisation of about JOD 18 billion. The Jordanian capital market, like other capital markets in emerging economies, has characteristics that affect sustainability reporting practices, such as the role of controlling shareholders (usually founding families), the growing but still limited presence of institutional investors, and the evolving regulations (Young et al., 2008). The Big Four accounting firms operate in Jordan

through local offices, and a number of national accounting firms are available for environmental and sustainability consulting experience.

2.3 The 2023 Mandatory Sustainability Assurance Reform

In January 2023, the JSC issued Directive No. 14/2023 on External Assurance of Sustainability Reports, which applies to companies listed on ASE with a market capitalization of JOD 100 million or more. The directive mandates external assurance of sustainability reports through assurance engagements conducted by licensed audit firms with experience in the sustainability field, following either ISAE 3000 (IAASB, 2013) or the soon to be issued ISSA 5000 (IAASB, 2023) standards, for reports related to the financial year 2023 and thereafter.

The structure of the regulation provided a treatment and control group for the purpose of causality inference. The barrier of JOD 100 million applied to almost 38 firms on the date the directive came into effect. Other firms listed on the ASE (excluding banks and insurance companies that are under other directives from the Central Bank of Jordan) made up a control group of about 72 firms that disclose sustainability information sufficient for study.

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

3.1 Regulatory Impact Theory and Mandatory Assurance

In understanding the impact of a mandatory assurance on firms' reporting behavior, the economic theory of regulation, where regulation is viewed as a product that can be "supplied" by the government or by private entities at different levels, is instructive. Building on the seminal work of Stigler (1971) over the years, many economists have further refined the model, including Peltzman (1976) and Posner (1974). As the theory suggests, the structure and the level of regulation modify the cost and rewards received by various constituents. Considering sustainability reporting, a requirement for mandatory assurance increases the cost of providing poor-quality sustainability reports by introducing an independent source that is likely to detect failures in a firm's sustainability performance, thereby increasing the risk to the firm's reputation.

DeAngelo's (1981) model of audit quality captures the joint probability of detecting and reporting material misstatements. Analogically, this model can be applied to the sustainability assurance context. The voluntary nature of the sustainability reporting regime causes the reporting firm to self-select into sustainability assurance process, which increases the difficulty of establishing a causal relationship between assurance and sustainability reporting quality (Simnett et al., 2009). A mandatory regime would remove the self-selection component, since all reporting firms would be required to obtain sustainability assurance regardless of their individual sustainability reporting practices, thereby making it easier to identify the effects of sustainability assurance on the sustainability reporting (Leuz & Wysocki, 2016).

To date, empirical research on the impacts of mandatory sustainability assurance is only available in Europe and Australia/New Zealand. Martínez-Ferrero and García-Sánchez (2017) and Kolk and Perego (2010), respectively, studying the French Grenelle II Act and Dutch mandatory reporting laws, found positive changes in assurance engagement features and small improvements in sustainability report quality. On top of that, these studies are conducted in developed countries where institutions are well established, so they have little bearing on developing countries where enforcement and other support structures, auditor education and training, and other market features may vary considerably.

H¹

The introduction of mandatory sustainability assurance is associated with a significant improvement in SDG reporting quality among treated ASE-listed firms relative to control firms.

3.2 Audit Quality Production Function in Sustainability Contexts

The audit quality production function developed by Francis (2011) and further discussed by DeFond and Zhang (2014) analyzes audit quality as a function of the inputs of auditors (effort, expertise, and independence) and other environmental influences (such as regulatory oversight and litigation risk). The production function is affected by mandatory assurance requirements in several ways. First, where engagements are mandated, the scope of assurance may increase, requiring the auditor to verify a broader range of SDG indicators. Second, the costs to reputation from failure in providing assurance under a mandatory environment may lead auditors to increase their expertise in sustainability matters (Green & Taylor, 2013). Third, mandatory engagement fees are based on increased resources used to create the required expertise in sustainability matters (Fuhrmann, Ott, Looks, & Guenther, 2017).

H²

Mandatory sustainability assurance is associated with (a) higher assurance fees reflecting enhanced auditor effort and (b) broader assurance scope encompassing a greater number of SDG-related verification procedures.

3.3 Emerging Market Governance and Moderating Mechanisms

Emerging markets literature on corporate governance focuses on the principal-agent conflict (Young et al., 2008), and agency conflicts involving controlling and minority shareholders rather than managers and dispersed owners. Controlling families may resist initiatives that would increase transparency and reveal related transactions, tunneling, or preferential treatment (Chen, Dyball, & Wright, 2018).

Another complementary governance mechanism is the audit committee composition. The presence of audit committee members with sustainability knowledge, such as experience in environmental

management, ESG reporting, or sustainability assurance, can help the committee question the scope of assurance engagement, challenge the methodology used by the auditor, and advocate for incorporating the results of assurance in better reporting practices (Hodge, Subramaniam, & Stewart, 2009). The choice of assurance provider could moderate the effects, where the Big Four audit firms have more sustainability-related experience, higher reputational pressure, and more methodologies available compared to local firms (Perego & Kolk, 2012).

H³

The positive effect of mandatory sustainability assurance on reporting quality is (a) amplified by audit committee sustainability expertise and (b) attenuated by concentrated family ownership.

H⁴

Mandatory sustainability assurance reduces information asymmetry and cost of equity among treated firms, with the effect moderated by auditor type.

4. RESEARCH DESIGN

4.1 Sample Construction and Data Sources

This study aims to focus on non-financial firms listed on ASE over the five fiscal years spanning from 2020 to 2024, constituting a panel., with two years after the reform and three years before the reform (2020–2022 as pre-reform years and 2023–2024 as post-reform years). We exclude banks, insurance companies, and brokerage firms because they are supervised and governed by different prudential rules issued by the Central Bank of Jordan. Also, we exclude firms that are not actively disclosing sustainability information or those with incomplete financial data. Therefore, the final sample consists of 550 firm-year observations from 110 firms, with around 38 firms in the treatment group (above the JOD 100 m capitalization threshold) and 72 firms (below the threshold) in the control group.

Data on the quality of SDG reporting are manually collected from the annual, sustainability, and integrated reports submitted to the ASE and JSC. Assurance fee and scope data are collected from the assurance report, which usually describes, or from the notes to the annual report. Financial data are taken from the Amman Stock Exchange Company (ASE Co.) database and checked against Refinitiv Eikon. Governance data are coded from the corporate governance report, board of directors' composition, and/or proxy statement.

4.2 Variable Measurement

Dependent Variables. The first dependent variable is the SDG Reporting Quality Index (SDG_RQI). This index is a composite index ranging from 0 to 100. It measures five aspects of SDG reporting quality: the use of the GRI Standards, with a score ranging from 0 to 4; the presence of quantitative targets, timelines, and baseline comparisons as a percentage of the total score of 25; the use of third-party data

sources and verification, with a maximum score of 25; addressing materiality and including the views of other stakeholders in the index, with a top score of 25; and clearly tying each reported item to a specific SDG target, with a final component score of 21. The natural logarithm of the external assurance fees (LN_AF) is used as a proxy for the cost of assurance, where the fees are assumed to be in JOD. The scope of assurance (ASB) is measured by the number of different assured topics related to the SDGs. The information asymmetry measure (ASYM) is the yearly average of the bid-ask spread. The cost of equity (COE) is measured using the PEG ratio model (Easton, 2004).

Independent and Control Variables. The key independent variable is the DiD interaction term $POST \times TREAT$, where $POST$ is a time dummy variable equal to one in the years 2023–2024 and zero otherwise, and $TREAT$ is a dummy variable equal to one for firms above the JOD 100 million threshold and zero for firms below the threshold. The moderating variables included in my analysis are audit committee's sustainability expertise (AC_SE), family ownership concentration (FOC), and a Big Four auditor (BIG4) dummy variable. I also have a set of control variables in my model, including firm size (LN_MCAP), return on assets (ROA), leverage (LEV), board independence (BIND), firm age (LN_AGE), and a group of industry dummy variables.

4.3 Empirical Strategy

We use a DiD research design based on the 2023 regulatory threshold. Our baseline specification is as follows:

$$Y_{i,t} = \alpha + \beta_1 POST_t \times TREAT_i + \gamma Controls_{i,t} + \mu_i + \lambda_t + \epsilon_{i,t}$$

where β_1 measures the treatment effect, μ_i is firm fixed effect, and λ_t is year fixed effect. Standard errors are clustered by firm to allow for serial correlation (Bertrand, Duflo, & Mullainathan, 2004). Our research design relies on the parallel trends assumption, which we examine using event study plots, testing for coefficients on pre-trends, a placebo test where we assume 2021 was the treatment year, and a Rambachan and Roth (2023) sensitivity analysis around violations of the parallel trends assumption.

4.4 Heterogeneity and Mechanism Analysis

To test H3 and H4, we estimate triple difference specifications where we interact the DiD term with governance moderators. To study the mechanisms, we perform Sobel mediation tests to determine whether the channels of auditor effort (i.e., the breadth of the assurance scope), governance oversight, and reputation mediate the relationship between mandatory assurance and reporting quality.

4.5 Robustness Checks

We perform two sets of robustness tests. First, we re-run the main specifications using a placebo capitalisation threshold of JOD 80 million and JOD 120 million. Second, we use the entropy balancing technique from Hainmueller (2012) to re-weight observations in the control group to achieve exact balance in the first three moments of the distributions of firms' size, profitability, use, and board

independence prior to the regulatory reform. To check for anticipation effects, we remove the year 2023 from our sample.

5. EMPIRICAL RESULTS

5.1 Descriptive Statistics

Summary statistics of the whole sample as well as for the treatment and control groups in pre-period and post-period are reported in Table 1. A total of 550 firm-year observations are available from the sample of 110 firms listed on the ASE. The mean value of the SDG_RQI for the pre-period is 42.3 and 38.1 for the treatment and control groups, respectively, indicating a difference in the quality of the sustainability-related CSR reporting practices before the reform between the two groups, where larger firms seem to have more mature sustainability-related reporting mechanisms in place. In the post-period, the mean value of the treatment group is 54.7, and the control group is 39.5, indicating that the raw difference in the difference-in-differences (D-I-D) measure is 10.8 points before considering the difference in differences estimate using regression analysis.

This matrix (unreported) indicates that SDG_RQI is positively associated with the audit committee's sustainability-related expertise (0.34) and a Big Four auditing firm (0.28). There is a strong positive association between the assurance fees and the size of the firm (0.56), indicating that larger firms likely have more complex reporting practices.

Table 1
Descriptive Statistics

Variable	Full Mean	Full SD	Treat Pre	Treat Post	Control Pre	Control Post
SDG_RQI	41.2	14.8	42.3	54.7	38.1	39.5
LN_AF	8.4	1.6	8.9	10.25	7.8	8.1
ASB	6.3	3.2	7.1	11.3	5.6	6.0
ASYM	0.032	0.014	0.030	0.025	0.034	0.033
COE (%)	11.2	3.4	10.8	9.95	11.6	11.5
LN_MCAP	4.2	1.1	5.1	5.2	3.5	3.6
ROA	0.04	0.06	0.05	0.06	0.03	0.03
LEV	0.38	0.21	0.36	0.35	0.40	0.41
BIND	0.42	0.18	0.46	0.48	0.39	0.40
AC_SE	0.15	0.12	0.19	0.21	0.12	0.13
FOC	0.34	0.22	0.31	0.30	0.37	0.38
BIG4	0.28	0.45	0.42	0.44	0.18	0.19
Notes: Treatment group includes firms above JOD 100 million market capitalisation. Pre-period: 2020–2022; Post-period: 2023–2024.						

5.2 Parallel Trends Validation

Figure 1 depicts the graphical evidence of annual means of SDG_RQI, LN_AF, and ASYM for both treatment and control groups. It suggests parallel trends between the two groups in the years 2020–2022 but diverges from 2023 onwards. The estimates from the event study, with 2022 as the reference year, indicate that the interactions in the pre-reform years, 2020 and 2021, are small and statistically statistically indistinguishable from zero, with the 95% confidence intervals easily encompassing zero. In the formal placebo test, we turn the year 2021 into a non-existent treatment year and find that the corresponding coefficients for all three outcomes are insignificant ($|t| < 1.2$). The F-statistic from the joint test of the pre-trend coefficients is 1.34 ($p = 0.27$), so we fail to reject the null hypothesis of equal pre-trends. Using Rambachan and Roth (2023), we test the sensitivity of our results to deviations from the assumption of parallel trends.

5.3 Main Difference-in-Differences Results

The results of the main difference-in-differences estimation are presented in Table 2. The coefficient of the interaction term POST $\times$ TREAT on SDG_RQI is 12.4 with a t-statistic (t) of 3.82 ($p < 0.01$), indicating a 29% increase from the mean of the treatment group in the pre-reform period. The coefficient on assurance fees is large, at 1.35 in log terms, with a t-statistic (t) of 4.15, amounting to a 286% increase,

this is the largest coefficient across our specifications, reflecting the significant reallocation of auditor resources. The number of assurance procedures increased by 4.2, with a t-statistic (t) of 3.47 ($p < 0.01$). The cost of equity decreased by 85 basis points with a t-statistic (t) of -2.94 , and the bid-ask spreads decreased by 0.5 percentage points with a t-statistic (t) of -2.31 ($p < 0.05$), reflecting a substantial decrease in information asymmetry. Regarding the control variables, firm size is positively associated with both reporting quality and assurance fees, while board independence is a positive predictor of SDG_RQI.

Table 2
Main Difference-in-Differences Results

POST × TREAT	(1) SDG_RQI	(2) LN_AF	(3) ASB	(4) COE	(5) ASYM
	12.4***	1.35***	4.2***	-0.85***	-0.005**
	(3.82)	(4.15)	(3.47)	(- 2.94)	(- 2.31)
LN_MCAP	2.1**	0.45***	0.8*	-0.22	-0.001
	(2.24)	(3.10)	(1.78)	(- 1.42)	(- 0.89)
ROA	8.3*	0.21	1.1	-1.45**	-0.003*
	(1.82)	(0.93)	(1.21)	(- 2.18)	(- 1.74)
BIND	5.6**	0.18	1.4*	-0.38	-0.002
	(2.15)	(1.12)	(1.88)	(- 1.04)	(- 1.22)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	550	550	550	550	550
R ²	0.64	0.71	0.58	0.52	0.47
Notes: t-statistics based on firm-clustered standard errors in parentheses. ***, **, * denote significance at 1%, 5%, and 10% levels.					

5.4 Heterogeneity Analysis

Table 3 presents the triple difference estimates. The presence of review committee sustainability knowledge increases the treatment impact by 8.3 points ($t = 2.41$, $p < 0.05$), verifying H3a. A one-sigma increase in AC_SE would increase the SDG_RQI score by 1.0 points on top of that, over and above the DiD estimates, indicating that internal governance expertise is a complement to the external assurance and not a substitute.

We find that family ownership concentration decreases the magnitude of the treatment effect by 6.7 points and is significant at the 5% level with a t-statistic of -2.08 , thus, providing support to the H3b. This result may be explained by the principal–principal agency problem, where concentrated family-

controlled firms object to the transparency-increasing practices that may reduce the private benefits of control. We find that the interaction term between family and Big Four is positive and equal to 3.1 but only marginally significant at the 10% level with a t-statistic of 1.89, which suggests a slight additional effect of using a Big Four firm that can be explained by the embryonic stage of the sustainability assurance skills of international audit firms' members in Jordan.

Table 3
Heterogeneity Analysis (Triple Differences)

POST × TREAT	(1) AC_SE	(2) FOC	(3) BIG4
	10.8***	15.1***	11.2***
	(3.25)	(4.02)	(3.48)
POST × TREAT × Moderator	8.3**	−6.7**	3.1*
	(2.41)	(− 2.08)	(1.89)
All two-way interactions	Yes	Yes	Yes
Controls & FE	Yes	Yes	Yes
N	550	550	550
R ²	0.67	0.66	0.65
<i>Notes: Dependent variable is SDG_RQI. All two-way interactions and baseline controls included. t-statistics in parentheses. ***, **, * denote significance at 1%, 5%, and 10%.</i>			

5.5 Mechanism Analysis

Sobel mediation test results are reported in Table 4. The auditor effort channel, via the breadth of assurance scope, mediates 45% of the total effect on SDG_RQI (Sobel $z = 3.21$, $p < 0.01$). This channel dominates, as it captures the audit production function by increasing the mandatory engagement of the auditor inputs for the verification procedures the auditor inputs for the verification procedures (Francis, 2011). The governance oversight channel mediates 23% of the effect (Sobel $z = 2.14$, $p < 0.05$), indicating that the mandatory assurance triggers governance initiatives, such as creating the sustainability committee or board training in CSR that enhances reporting quality without the mandatory assurance. The reputation channel, via media sentiment, is not significant (Sobel $z = 1.38$) due to a low presence for sustainability journalism in Jordan.

Table 4
Mechanism Analysis (Sobel Mediation Tests)

Channel	Direct	Indirect	% Mediated	Sobel z
Auditor effort (ASB)	6.8***	5.6***	45%	3.21***
Governance oversight	9.5***	2.9**	23%	2.14**
Reputational (media)	11.7***	0.7	6%	1.38
Notes: Dependent variable is <i>SDG_RQI</i> . ***, ** denote significance at 1% and 5%. Direct effect is the $POST \times TREAT$ coefficient controlling for the mediator.				

5.6 Robustness Analysis

Finally, Table 5 presents the checks on the robustness of the *SDG_RQI* results. When using placebo-thresholds of JOD 80 million and JOD 120 million as the random cutoffs, the resulting coefficients of 2.1 and 1.8 (with t-values of 0.87 and 0.72, respectively) are statistically insignificant, confirming that the results are not driven by the firm size effect but by the actual regulatory threshold. Using the entropy-balance technique (Hainmueller, 2012) produces a similar impact of 11.8 with a t-value of 3.64, compared to the baseline estimate, thus indicating that imbalance in the pre-treatment characteristics is not driving the results. Leaving out the transition year of 2023 to allay any anticipation effects finds a year one effect of 13.1 with a t-value of 3.91, which is slightly larger than the baseline estimate, indicating that the baseline estimate may be to some extent understating the true effect, as compliance may have started during 2023 itself.

Table 5
Robustness Checks (Dependent Variable: *SDG_RQI*)

Specification	β ($POST \times TREAT$)	t-stat	N
Baseline	12.4***	3.82	550
Placebo: JOD 80m threshold	2.1	0.87	550
Placebo: JOD 120m threshold	1.8	0.72	550
Entropy balancing	11.8***	3.64	550
Excl. 2023 (anticipation)	13.1***	3.91	440
Notes: All specifications include controls and fixed effects as in Table 2. t-statistics based on firm-clustered standard errors. *** denotes significance at 1%.			

6. DISCUSSION AND CONCLUSION

6.1 Theoretical Implications

The study findings have several theoretical implications. First, the significant impact on the SDG_RQI measure confirms the regulatory impact theory's predictions in the context of an emerging market. According to this theory, the mandatory regime created binding constraints that altered corporate behaviours on sustainability reporting in a way that cannot be achieved in the voluntary regime (Stigler, 1971; Leuz & Wysocki, 2016). This is the first study that provides evidence from the MENA region about the impact of the mandatory sustainability assurance mandates.

Second, the increase in assurance fees by 286% as well as the increase in the number of assurance procedures by 4.2 together suggest that the audit production function has a significant shift-up change due to the mandatory assurance (Francis, 2011; DeFond & Zhang, 2014). The finding that the auditor effort channel dominates the firm's governance and reputational channel (45% mediation) suggests that the mandatory regulations function mainly on the supply side by increasing auditor resources rather than merely through increasing firms' incentives to "demand" assurance.

Third, the heterogeneity findings have implications for the boundary conditions. We find that the amplification effect of audit committee sustainability expertise is consistent with the complementarity hypothesis that internal expertise and assurance processes work together, where audit committees with expertise in sustainability issues are likely to understand the assurance outcome and bring greater improvements to the sustainability reports (Hodge et al., 2009). We also find that family ownership concentration diminishes the effect of assurance, which is in line with the principal–principal theoretical framework (Young et al., 2008), where concentrated controlling shareholders resist transparency mechanisms that may reveal private gains from control. These conditional effects provide a more nuanced view regarding the impact of assurance as opposed to a view of absolute effectiveness.

6.2 Policy Implications

In sum, our findings suggest that regulators such as the JSC that are considering introducing mandatory assurance in emerging markets can strengthen the implementation and effectiveness of the mandatory assurance by adopting complementary governance provisions to account for the differences in corporate governance structures between emerging and developed markets. For instance, introducing requirements for minimum expertise in sustainability issues in audit committees and strengthening the protection of minority shareholders in firms with concentrated ownership structures would help mandatory assurance effectiveness. Additionally, the regulator can explore ways to develop and encourage the role of media and analysts focusing on sustainability issues to strengthen the otherwise undeveloped reputation channel we document in our setting.

For international standard setters, our findings provide support for the IAASB in its current efforts under ISSA 5000 to encourage an attitude of scepticism and broaden the scope of sustainability assurance (IAASB, 2023). That the breadth of the assurance scope is the most significant mediator for the improvement in the quality of the sustainability reports provides support for the need for more prescriptive, rather than principle-based, standards that specify a minimum level of verification procedures.

6.3 Limitations and Future Research

First, our analysis focuses on a single country. While sample firms in Jordan resemble many MENA and other developing countries with concentrated ownership structures, new laws and regulations, and nascent capital markets, variations among countries could lead to different impacts of external assurance. Second, the post-reform period studied is short, covering only two years after the announcement of the reform. A longer window would better capture the long-term impact of the reform and distinguish short-term reaction from the long-term effects. Third, our SDG_RQI measure is based on researchers' assessments. Although we conduct inter-coder reliability tests to ensure the validity of our measures, there are still risks linked to proxy measures. Fourth, we do not find any evidence of bunching around the capitalisation threshold of JOD 100 million using a McCrary (2008) test. But, this test cannot eliminate the chance of firms reacting to the threshold.

Finally, future research could conduct a comparative analysis of mandatory assurance reforms' effect in the MENA economies as other countries enact the mandatory assurance requirement, investigate the longer-term effects of the treatment, employ textual analysis for the assurance report used on the language and detail of the report, and study the portfolio choice of investors who receive the mandatory assurance signal in thin markets.

6.4 Concluding Remarks

Overall, the study provides empirical evidence that mandatory sustainability assurance is a powerful regulatory mechanism for improving sustainability reporting credibility in emerging markets that can complement other governance mechanisms and ownership structure. The recent change in Jordan's sustainability-reporting regulations in 2023 provides evidence that similar regulatory changes can improve the audit production function, reduce information asymmetry, and ultimately reduce the cost of equity, which is helpful and of interest to regulators, audit firms and investors in the emerging markets within the MENA region and elsewhere.

Declarations

Competing Interests

No competing interests.

Funding

No funding received.

Author Contribution

Acknowledgments

The author thanks colleagues for their feedback.

Data Availability

The data that support the findings of this study are derived from publicly available annual reports and financial disclosures of companies listed on the Amman Stock Exchange (ASE). The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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Figures

Image not available with this version

Figure 1

Figure depicts the graphical evidence of annual means of SDG_RQI, LN_AF, and ASYM for both treatment and control groups.